FORM-PTO-1390 (Rev. 9-2001) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 000500-327

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5): 10/018577

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/SE00/01207	09 June 2000	11 June 1999

TITLE OF INVENTION
THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES

APPLICANT(S) FOR DO/EO/US
Charlotte PERSSON et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). *The submission must include items (5), (6), (9) and (21) indicated below.*
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **(unexecuted)**
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☒ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: International Preliminary Examination Report and the International Search Report

21839

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/018577	PCT/SE00/01207	000500-327

21. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,040.00 (960)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $890.00 (970)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $740.00 (958)		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $710.00 (956)		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00 (962)		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 1,040.00	
Surcharge of **$130.00 (154)** for furnishing the oath or declaration later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	13 -20 =	0	X$18.00 (966)	$	
Independent Claims	1 -3 =	0	X$84.00 (964)	$	
Multiple dependent claim(s) (if applicable)			+$280.00 (968)	$	
TOTAL OF ABOVE CALCULATIONS =				$ 1,040.00	
Reduction for 1/2 for filing by small entity, if applicable (see below).			+	$	-
SUBTOTAL =				$ 1,040.00	
Processing fee of **$130.00 (156)** for furnishing the English translation later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(f)).			+		
TOTAL NATIONAL FEE =				$ 1,040.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 (581)** per property			+	$	
TOTAL FEES ENCLOSED =				$ 1,040.00	
				Amount to be refunded:	$
				charged:	$

a. ☐ Small entity status is hereby claimed.

b. ☒ A check in the amount of $ 1,040.00 to cover the above fees is enclosed.

c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Ronald L. Grudziecki
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

William C Rowland
SIGNATURE

William C. Rowland
NAME

30,888
REGISTRATION NUMBER

December 11, 2001
DATE

Patent
Attorney's Docket No. 000500-327 #4/a

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	
	)	
Charlotte PERSSON et al.	)	Group Art Unit: Unassigned
	)	
Application No.: Unassigned	)	Examiner: Unassigned
	)	
Filed: December 11, 2001	)	
	)	
For: THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES	)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-captioned patent application, please enter the following amendment.

IN THE CLAIMS:

Please cancel claim 1.

Please amend claims 2-8 as follows:

2. (Amended) The method according to claim 9, wherein the highest WVTR of the package is 4 g/m^2/calendar day in accordance with ASTME 398-83.

3. (Amended) The method according to claim 9, wherein the highest WVTR of the package is 2 g/m^2/calendar day in accordance with ASTME 398-83.

4. (Amended) The method according to claim 9, wherein the highest WVTR of the package is 1 g/m^2/calendar day in accordance with ASTME 398-83.

5. (Amended) The method according to claim 9, wherein the film material comprises several layers of material.

6. (Amended) The method according to claim 9, wherein the package comprises a moisture indicator.

7. (Amended) The method according to claim 9, wherein the package comprises a moisture absorbent.

8. (Amended) A pack enclosing an absorbent article for absorption of bodily fluids , the absorbent article having at least one moisture-sensitive additive, wherein the highest WVTR (Water Vapour Transmission Rate) of the pack is 6 g/m^2/calendar day in accordance with ASTME 398-83.

Please add new claims 9 -14 as follows:

--9. A method of packaging an absorbent article that comprises one or more moisture-sensitive additives, comprising the steps of using at least one essentially impervious film material that has a highest WVTR (Water Vapour Transmission Rate) of 6 g/m^2/calendar day in accordance with ASTME 398-83 to package the absorbent article, wherein the package is fully sealed with impervious joins or seams.

10. The method according to claim 5, wherein the several layers comprise different material.

11. The method according to claim 6, wherein the moisture indicator is a silica gel.

12. The pack according to claim 8, wherein the highest WVTR of the pack is 4 g/m^2/calendar day in accordance with ASTME 398-83.

13. The pack according to claim 8, wherein the highest WVTR of the pack is 2 g/m^2/calendar day in accordance with ASTME 398-83.

14. The pack according to claim 8, wherein the highest WVTR of the pack is 1 g/m^2/calendar day in accordance with ASTME 398-83.--

REMARKS

The foregoing amendments are made to place the claims in the preferred U.S. format and to remove multiple claim dependencies.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: William C. Rowland

William C. Rowland
Registration No. 30,888

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: 12/11/01

Attachment to Preliminary Amendment dated December 11, 2001

Marked-up Claims -

2. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the highest WVTR of the package is 4 g/m^2/calendar day in accordance with ASTME 398-83.

3. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the highest WVTR of the package is 2 g/m^2/calendar day in accordance with ASTME 398-83.

4. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the highest WVTR of the package is 1 g/m^2/calendar day in accordance with ASTME 398-83.

5. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the [packaging] film material comprises several layers of material [, where said various layers comprise one or more than one material].

6. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the package comprises a moisture indicator [, such as silica gel].

Attachment to Preliminary Amendment dated December 11, 2001

Marked-up Claims -

7. (Amended) The [use] method according to [any one of the preceding Claims] claim 9, wherein the package comprises a moisture absorbent.

8. (Amended) A pack enclosing an absorbent article for absorption of bodily fluids , the absorbent article having at least one moisture-sensitive additive, [characterised by that] wherein the highest WVTR (Water Vapour Transmission Rate) of the pack is 6 g/m^2/calendar day in accordance with ASTME 398-83.

THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES

FIELD OF INVENTION

The present invention relates to the use of moisture impervious packaging units for absorbent articles, such as sanitary napkins, panty liners, tampons, incontinence protectors and diapers, that comprise one or more active, moisture-sensitive additives or substances. The packaging unit is comprised of film material that has low vapour and gas permeability and tight joins.

BACKGROUND OF THE INVENTION

Absorbent articles, such as sanitary napkins, diapers, incontinence protectors, panty liners and tampons have consistently been packaged in open packages into which air can enter freely. Packaging of this nature has many advantages. Handling with respect to manufacture and also with respect to the individual consumer is facilitated by the fact that the package containing the absorbent article can be compressed (air can leave the package freely), and the package can also be easily opened. It is also difficult from a purely technical aspect to produce tight joins at present day production rates.

However, it is becoming more common to include different active additives in absorbent products for different reasons. Examples in this respect are odour-inhibiting additives or deodorants, such as zeolites and silica for example, as described, *inter alia*, in WO 97/46188, WO 97/46190, WO 97/46192, WO 97/46193, WO 97/46195 and WO 97/46196. These additives are intended to act essentially in the product. Another example is the addition to diapers of softeners, e.g. lotions, which shall be transferred from the product to the wearer's skin. A further example is the addition of lactobacilli with the intention of inhibiting

bacteria in the product, or for transfer to the wearer and thereby enhance defence against undesired bacteria. The addition of lactobacilli and their favourable effects is also mentioned in, *inter alia*, SE 9703669-3, SE 9502588-8, WO 92/13577, SE 9801951-6 and SE 9804390-4.

The aforesaid additives often loose some of their properties or effectiveness at high moisture contents. This problem is thus new in the field of absorbent products. The odour-inhibiting capacity of zeolites is reduced when they become saturated with water. This is mentioned, *inter alia*, in WO 98/17239. One problem with lactobacilli in absorbent products resides in their rapid demise when exposed to ambient moisture and temperature above a certain threshold; see Figure 3. Thus, in normal surroundings such as in transportation and during storage, for instance, the absorbent articles will be subjected to such conditions as to render the death of the lactobacilli present unavoidable (see Figure 1) when the articles are packaged in accordance with known technology. Survival of lactobacilli can be achieved by bringing them into a rest state. This state can be achieved either by freezing or drying the lactobacilli, or by a combination of these processes, i.e. so-called freeze-drying. In order to make possible the use of conventional absorbent product distribution and sales channels, drying of the lactobacilli and retention of this dryness is preferred to freezing. When the product, or article, is applied to the body, the moisture and temperature conditions that then prevail will be optimal for re-activation of the lactic acid bacteria.

However, it may be difficult to retain dryness when storing in a humid atmosphere. This applies particularly to absorbent products, as it lies in the nature of the product to absorb moisture from the surrounding atmosphere. It is therefore particularly important to protect absorbent products that contain lactobacilli against high humidities. The packages used at present for packaging absorbent articles cannot be considered to satisfy the need for such protection, partly because the material used is moisture permeable and secondly because the packaging joins or seams are not tight. Single-item packaging units for sanitary napkins and panty liners are often

comprised of polypropylene or polyethylene plastic, which have a relatively high moisture permeability (see table 1, film 8), and the packages are also often provided with an unsealed opening in the centre of the package, so that air is able to pass freely into and out of the package and therewith permit a certain degree of compression. External wrappers or bags are also often perforated to facilitate opening of the package.

US-A-5833070 refers to a stretched film of polychlorotrifluoroethylene, a method for its production, and a product package, in which the film is used. The film must at least partly comprise trifluoroethylene. The film can be used to pack some products in a moisture impermeable way, such as preferably an electro-luminiscent means. Thus, this film is stretched, which leads to it being stiff, fragile and rustle. Accordingly, it is not suitable as a package film for hygiene articles for some reasons. A film for hygiene articles should be silent and smooth to be experienced as discrete by the consumer. A film for hygiene article applications should also be possible to fold, which makes a stiff film unsuitable. Further, the air in the product should be pressed out in the same step as the packaging, which makes a stiff, blister-package like film inadequate.

EP-A1-0773102 refers to a multi-layer laminate and its use. One of the layers must at least partly comprise an ethylene-/cycloolephine-copolymer, and one layer must be a polymer layer. Polyethylene, polypropylene and vinyl are mentioned as possible materials. The thickness of the layers can be 1 μm – 10 mm. This laminate can be used as a moisture protection for drugs and food. The laminate is for instance suitable for use as a PTP (press through pack) or as a blister package. Those types of packages are not suitable for absorbent products, for the reasons discussed above.

Further, EP-A2-0613824 discloses a moisture tissue-containing package, having the object to retain the moisture in a package. The film disclosed here is too thick for use in relation to absorbent articles. US-A-5443161 describes a moisture

impermeable "baby-care"-kit, in which the package consists of a polypropylene layer, having a thickness of 2 mm.

In summary, there is thus a need to package absorbent articles that contain moisture-sensitive additives in a manner, which will ensure that these additives will not be harmed or destroyed and which will also ensure that the quality of the product is retained.

OBJECT OF THE INVENTION

Accordingly, the object of the present invention is to provide protection against the effect of ambient moisture from the time of packaging an absorbent article to the time when it is used, so as to allow the active additive to retain its properties in the absorbent article during storage and when the absorbent article is used.

SUMMARY OF THE INVENTION

The invention relates to the use of an essentially tight film material that has a highest WVTR (Water Vapour Transmission Rate) of 6 g/m^2/calendar day in accordance with ASTME 398-83 at 87.8°C (100°F) and 90% relative humidity for packaging an absorbent article that comprise one or more moisture-sensitive additives.

DETAILED DESCRIPTION OF THE INVENTION

By an "essentially impermeable" film material is meant a material whose impermeability is so high that a package comprised of said material will not allow more moisture to enter than that at which the active moisture-sensitive additive present in the package will essentially retain their properties despite this uptake of moisture. This means that the packaging unit may have a highest WVTR (Water Vapour Transmission Rate) of 6 g/m^2/calendar day according to ASTME 398-83 at

37.8°C (100°F) and 90% relative humidity, preferably at most 4 g/m^2/calendar day, and more preferably at most 2 g/m^2/calendar day and even more preferably at most 1 g/m^2/calendar day. The material used will also preferably protect the moisture-sensitive additives in such a way that said additives will retain their effect for at least 9 months and preferably for 18 months after the packaging date.

By "film material" is meant film that is produced, at least partially, from one or more polymers suitable for use in accordance with the invention, such as PE (polyethylene), PP (polypropylene), PET (polyester), PA (polyamide), PETP, PVA (polyvinyl alcohol), or similar polymers, or aluminium foil, aluminium oxide or silicon oxide or the like, an example of these latter three materials being Techbarrier S, V, H, T, AT, NR, NY (Mitsubishi, Helional WTY (Amcor Flexibles), VA 535670 (metallised PE/PET) (Nordenia), 4364 (Schur-Flexible), Coex HDPE Surlyn (Schur-Flexible), Coex Cheerios (Schur-Flexible).

The data and values mentioned in the aforegoing with respect to WVTR (Water Vapour Transmission Rate) correspond to unsaturated values in accordance with the standard ASTME 398-83, which is generally applied in this field and is known to the person skilled in this art.

By "absorbent article" is meant articles such as sanitary napkins, diapers, tampons, panty liners, incontinence protectors and similar products, that are partially comprised of absorbent material, for instance a cellulose material such as airlaid, LDA, chemical pulp or CTMP.

By "moisture-sensitive additives" is meant additives that are intended to contribute to the effect and function of the product in some way and whose properties may be impaired when they are exposed to moisture, e.g. in storage. Examples of such moisture-sensitive additives are odour-inhibiting additives, such as zeolites and silica, and lactobacilli.

In order to obtain an essentially impermeable packaging unit, the WVTR of the polymeric material used for packaging purposes will be at most 6 g/m^2/24 h measured in accordance with ASTME 398-83 at 37.8°C (100°F) and 90% relative humidity, preferably at most 4 g/m^2/24 h, and more preferably at most 2 g/m^2/24 h and even more preferably at most 1 g/m^2/24 h.

Polymeric material suitable for use as packaging unit is, e.g., PE (polyethylene), PP (polypropylene), PET (polyester), PA (polyamide), PETP, PVA (polyvinyl alcohol), or like polymeric material. Aluminium foil, aluminium oxide or silicon oxide, for instance, is used as supplementary sealing material. Examples of such materials are Techbarrier S, V, H, T, AT, NR, NY (Mitsubishi), Helional WTY (Amcor Flexibles), VA 535670 (metallised PE/PET) (Nordenia), 4364 (Schur-Flexible), Coex HDPE Surlyn (Schur-Flexible), Coex Cheerios (Schur-Flexible).

The films used will preferably have a thickness of 10-200 μm, preferably 20-100 μm.

The packaging material used is preferably comprised of several layers, where different layers may consist of different materials. The material intended to form a moisture barrier (impervious layer) is often expensive and there is preferably used the thinnest possible film with which the moisture blocking properties will nevertheless still be acceptable. In order to produce packaging material that has good wear strength and can be readily sealed, a less expensive material may be used as outer protective wear layers and/or as inner sealing layers. For instance, the packaging material may include an inner material that enables a good seal to be obtained, e.g. PE, PP, EVA, EEA or wax, an intermediate material that consists of the moisture-protective barrier material, the impervious layer, e.g. aluminium, aluminium oxide, silicon oxide or polyamide (nylon), and a somewhat stronger outer material that functions as barrier material, e.g. PETP, PE or PP. The packaging material may consist of one to ten layers of different materials.

In order to ensure that the packaging unit will prevent the ingress of moisture, it is also important that the package is completely closed with tight joins and seams so that the WVTR of the package will be at most 6 g/m^2/24 h measured in accordance with ASTME 398-83 at 37.8°C (100°F) and 90% relative humidity, preferably at most 4 g/m^2/24 h, and more preferably at most 2 g/m^2/24 h and even more preferably at most 1 g/m^2/24 h, even when measured across the joins and seams.

The impermeability of the joins and seams shall at least be equal to the impermeability of the film. Suitable sealing methods are, e.g., heat sealing, heat sealing at low temperatures, or cold sealing. The package may contain one or more articles.

Package sealing methods include heat sealing, heat sealing at low temperatures and cold sealing. In the case of cold sealing and heat sealing at low temperatures, a sealing layer, such as EVA, EEA or wax, is applied to the sealing side of the packaging unit. This sealing layer can be applied over the whole of the surface or solely where sealing shall occur, so-called border coating. In order to facilitate heat sealing, the films used as the impervious packaging layer and welding layer will normally include low density polyethylene (LDPE), optionally co-polymerised with butyl acrylate (EBA) or vinyl acetate (EVA). This enables heat sealing to be effected at high speeds. When packaging an article/articles, it is necessary to press the sealing material together around the product in the case of all sealing methods. This is achieved with the aid of cold, hot or slightly heated wheels or sealing jaws and must be effected at a pressure, and temperature and over a given time period that are appropriate for the material chosen and that will result in the intended joint tightness and joint strength.

The various layers may also be glued together.

The packaging unit shall be given the form of a bag and will preferably be easily opened without requiring the use of a tool to this end, for instance along a tear line. Figure 2 shows alternative designs.

The size of the packaging unit will depend on the size of the product and whether the product is three-folded, two-folded or unfolded or folded in some other way when packaged. Folding of the product may be effected in different ways. For instance, a three-folded product may be folded so as to form three parts of identical sizes or so as to form three parts of different sizes. The size of a packaging unit according to the invention will be 77-140 mm (length of the packaging unit across the width of the product) and 75-310 mm (length of the packaging unit in the longitudinal direction of the product) in the case of napkin (including mini-napkin, standard napkin + super and night napkin); 72-95 mm (length of the packaging unit across the width of the product) and 50-170 mm (length of the packaging unit in the longitudinal direction of the product) in the case of a panty liner; and 60-200 mm in width and 60-300 mm in length in the case of an external packaging unit. The packaging units may, of course, be larger for accommodating larger napkins such as incontinence protectors and diapers.

According to another aspect of the invention, the packaging unit will include a moisture indicator that shows whether or not the packaging unit has retained its impermeability to moisture. Such a moisture indicator may comprise silica gel, such as silica gel 1-3 mm (manufacturer: Prolab, purchased from KeboLab, Art. No. 27661290), which changes colour when taking up moisture.

The packaging unit can be constructed in several ways, for instance by placing two films on one another and sealing the four open sides with respective joins or seams, by joining together a folded film with three joins or seams on the three open sides, by folding a "flow packed" film into two and joining the two open sides together with two joins and a join on the open upper side. A weld join or seam may have a

width of about 20 mm. A few examples of packaging unit constructions will be evident from the following examples.

One aspect of the invention relates to a product packaging process which comprises (1) drying the absorbent article and applying the moisture-sensitive additive to the article either before or after drying said absorbent article, and (2) thereafter sealing the packaging unit containing said absorbent article to which said moisture-sensitive substance has been added.

It is important that the packaging unit and its contents are sufficiently dry when actually sealing said unit. This is ensured by drying the absorbent article in manufacture, either before or after applying the active additive.

When the active moisture-sensitive additive is comprised of lactobacilli, the additive can be applied in the form of a freeze-dried powder that contains lactobacilli, or in the form of a lactobacilli suspension. In this case, it is suitable to maintain the lowest possible water content or the highest possible concentration in the suspension in order not to introduce an unnecessary amount of water that must be later dried off. Lactobacilli will preferably be applied in an amount corresponding to 10^4-10^{11}, preferably 10^6-10^{10} CFU/product (CFU: Colony Forming Unit).

When the moisture-sensitive additive is an odour-inhibitor of the zeolite type, the additive can be applied to the product in powder form. A suitable quantity/product has been found to be 0.5-1.5 g. The zeolite powder may be glued firmly to the absorbent material when said material is a roll material of the kind designated airlaid or LDA. The powder may alternatively be mixed in the cellulose pulp when forming a pulp mat although this is less suitable with respect to zeolites, because of the high moisture content involved in mat forming processes, about 10-12 percent by weight, and because the zeolite will then be able to take up water and thereby impair its odour-absorbing properties, as before mentioned.

It has also been found beneficial to dry the absorbent material in the form of roll material such as LDA or airlaid material, which is known in the manufacture of napkins and panty liners. In this respect, it is suitable to dry the material to a water content below 1-2 percent by weight water. These materials can be dried at, e.g., 105°C over one calendar day.

The atmosphere surrounding the applicator equipment shall be kept as dry as possible, as absorbent material readily absorbs moisture from the surroundings. It has been found suitable for the atmosphere to have a less than 20% humidity. The equipment may also be supplemented with an IR drier (IR oven MA 40, manufacturer: Sartorius, purchased from Tillqvist Analys) mounted on the machine when applying the moisture-sensitive additive.

A dry atmosphere can be ensured in the packaging unit, by delivering to said unit a dry gas, e.g. carbon dioxide, that has a highest water content of 5 ppm, prior to sealing the package.

Alternatively, the packaged product can be given a desired degree of dryness by adding a drying substance, a moisture absorbent, such as silica gel or zeolite, for instance.

A Flow Wrapper SP-2 manufactured by Flow Wrapper is an example of packaging machines that can be used to produce a moisture-tight package.

When cold sealing, up to about 1500 products/min. can be packaged with known technology.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows temperature and air humidity when transporting sanitary products from Holland to Greece.

Fig. 2 illustrates examples of packaging processes, including joining, seaming and welding configurations (chequered surfaces).

Fig. 3 is a curve illustrating the death of LB at room humidity 50% at 20°C (schematically) as compared with room humidity of 30% at 20°C applied to a panty liner in an unsealed bag of the mini-grip type.

The following examples are intended merely to describe the invention in further detail and shall not be considered as representing a limitation of the scope of the invention.

Examples

Example 1 - Transport conditions.

This example shows how temperature and air humidity vary in the storage space during transportation of sanitary products (Figure 1) from Holland to Greece. The Figure shows that the relative humidity varies from 27-75% and the temperature varies from 10-50°C.

Example 2 - The affect of moisture on the lifetime of lactobacilli.

Figure 3 illustrates the survival time of lactobacilli that have been applied to a panty liner in a permeable minigrip-type bag in different humidity conditions (30% and 50% respectively). Lactobacilli quickly die in a normal climate (20°C, 50% relative humidity) (Figure 3). These conditions correspond to a water content of an airlaid

article material of about 4 percent by weight. The lactobacilli survive far better at a lower moisture content (20°C, 30% relative humidity) (Figure 3). The airlaid material has a water content of about 3 percent by weight in this climate.

Example 3 - Desiccant.

The following working examples demonstrate the possibility of subsequently drying the material with the aid of a suitable desiccator. Commercially available panty liners retailed under the trademark Libresse were stored in a normal room climate of 20°C and 44% humidity. The water content of the products was measured with a hygrometer that included IR elements (IR oven MA 40, manufacturer: Sartorius, purchased from Tillqvist Analys) and found to be 4 percent by weight. The products were then packed singly in impervious aluminium bags together with two different types of desiccant, silica gel, so-called blue gel (silica gel 1-3 mm, Prolab, purchased from KeboLab, Art. No. 27661290) on the one hand and zeolite MOLSIV ADSORBENT type 13X in powder from United Oil Products on the other hand. Different quantities of powder were added, whereafter the samples were stored in a normal room climate (see above) for two calendar days. After two calendar days, the panty liners were taken out of the aluminium packages and the water content determined with the same apparatus as that mentioned above. It was found that the water content of the products had already fallen to about 1.5 percent by weight when adding 1 g powder/package. Higher quantities were not found to significantly lower the water content. The addition of the moisture absorbent powder to the package or to the product is thus an alternative method of achieving the desired dryness in order for the added lactobacilli to survive.

Example 4 - Moisture uptake in odour inhibitors.

The following example is intended to demonstrate the effect of a sealed packaging unit with respect to a deodorising capacity. Panty liners were produced by joining together PE film, airlaid 105 g/m^2 and NW by means of hotmelt glue. 0.5 g of

ABSCENTS 5000 was added to the product between the plastic backing sheet and the airlaid sheet. Subsequent to manufacture, half of the products were packed in impervious aluminium bags, which were welded together. The other half of the products were packed in conventional one-piece packages, which were open to the atmosphere on one side. The products were then stored in a climate room at a temperature of 20°C and a humidity of 50% for six calendar days. The deodorising or odour-inhibiting capacity was determined after storage in the following way: the products were removed from their respective packages and a 1.5 ml ammonia solution 0.2% was added to the products. The products were then placed in impervious plastic cans. A panel of six persons then carried out a sniff test after two hours. A can that contained a product, which had no zeolite or ammonia, was used as a reference. The cans were marked A=product stored in a conventional bag, B=reference with no ammonia odour, and C=product stored in impervious bags. The panel was asked to compare the samples in pairs and to indicate which sample had the strongest smell. The samples were then ranked from the strongest to the weakest smell. A unanimous verdict of ACB was given.

Example 5 - Material WVTR.

The WVTR of a number of materials was determined in the search for suitable material for use in accordance with the invention. The WVTR of these materials was determined with the aid of an apparatus designated LYSSY L 80-4000. The materials, their thicknesses and measured WVTR are shown in Table 1.

Table 1 - Various materials and their WVTR (Water Vapour Transmission Rate).

No.	Material	Manufacturer	Thickness (μm)	WVTR (g/m^2/cal. Day)
1	Techbarrier H + PE + PET	Mitsubishi	30	0.3
2	VA 535670 (metallised PE/PET)	Nordenia	30	0.3
3	Techbarrier V + PE + PET	Mitsubishi	30	0.7
4	4364	Schur-Flexible	85	1.3
5	Coex HDPE Surlyn	Schur-Flexible	50	1.7
6	Coex Cheerios	Schur-Flexible	60	2.6
7	PETP/PE		60	4.9
8	Libresse SW film	M&W	40	9.7
9	Libresse bag (cito)	M&W	40	22

Example 6 - Packaging embodiments.

This example shows three options of constructing packages in accordance with the invention (Figure 2).

10/018577 NI SE0001207
JC13 Rec'd PCT/PTO 14 DEC 2001

CLAIMS

1. The use of at least one essentially impervious film material that has a highest WVTR (Water Vapour Transmission Rate) of 6 g/m^2/calendar day in accordance with ASTME 398-83 for packaging an absorbent article that comprises one or more moisture-sensitive additives, wherein the package is fully sealed with impervious joins or seams.

2. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is 4 g/m^2/calendar day in accordance with ASTME 398-83.

3. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is 2 g/m^2/calendar day in accordance with ASTME 398-83.

4. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is 1 g/m^2/calendar day in accordance with ASTME 398-83.

5. The use according to any one of the preceding Claims, wherein the packaging material comprises several layers of material, where said various layers comprise one or more than one material.

6. The use according to any one of the preceding Claims, wherein the package comprises a moisture indicator, such as silica gel.

7. The use according to any one of the preceding Claims, wherein the package comprises a moisture absorbent.

8. A pack enclosing an absorbent article for absorption of bodily fluids having at least one moisture-sensitive additive, characterised by that the highest WVTR (Water Vapour Transmission Rate) of the pack is 6 g/m^2/calendar day in accordance with ASTME 398-83.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 December 2000 (21.12.2000)

PCT

(10) International Publication Number
WO 00/76878 A1

(51) International Patent Classification[7]: B65D 81/24

(21) International Application Number: PCT/SE00/01207

(22) International Filing Date: 9 June 2000 (09.06.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
9902207-1 11 June 1999 (11.06.1999) SE

(71) Applicant *(for all designated States except US)*: **SCA HYGIENE PRODUCTS AB** [SE/SE]; S-405 03 Göteborg (SE).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **PERSSON, Charlotte** [SE/SE]; Torild Wulffsgatan 47, S-413 19 Göteborg (SE). **PERSSON, Håkan** [SE/SE]; Sjömansgatan 7, S-413 15 Göteborg (SE).

(74) Agents: **BERG, S., A. et al.**; Albihns Patentbyrå Stockholm AB, P.O. Box 5581, S-114 85 Stockholm (SE).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

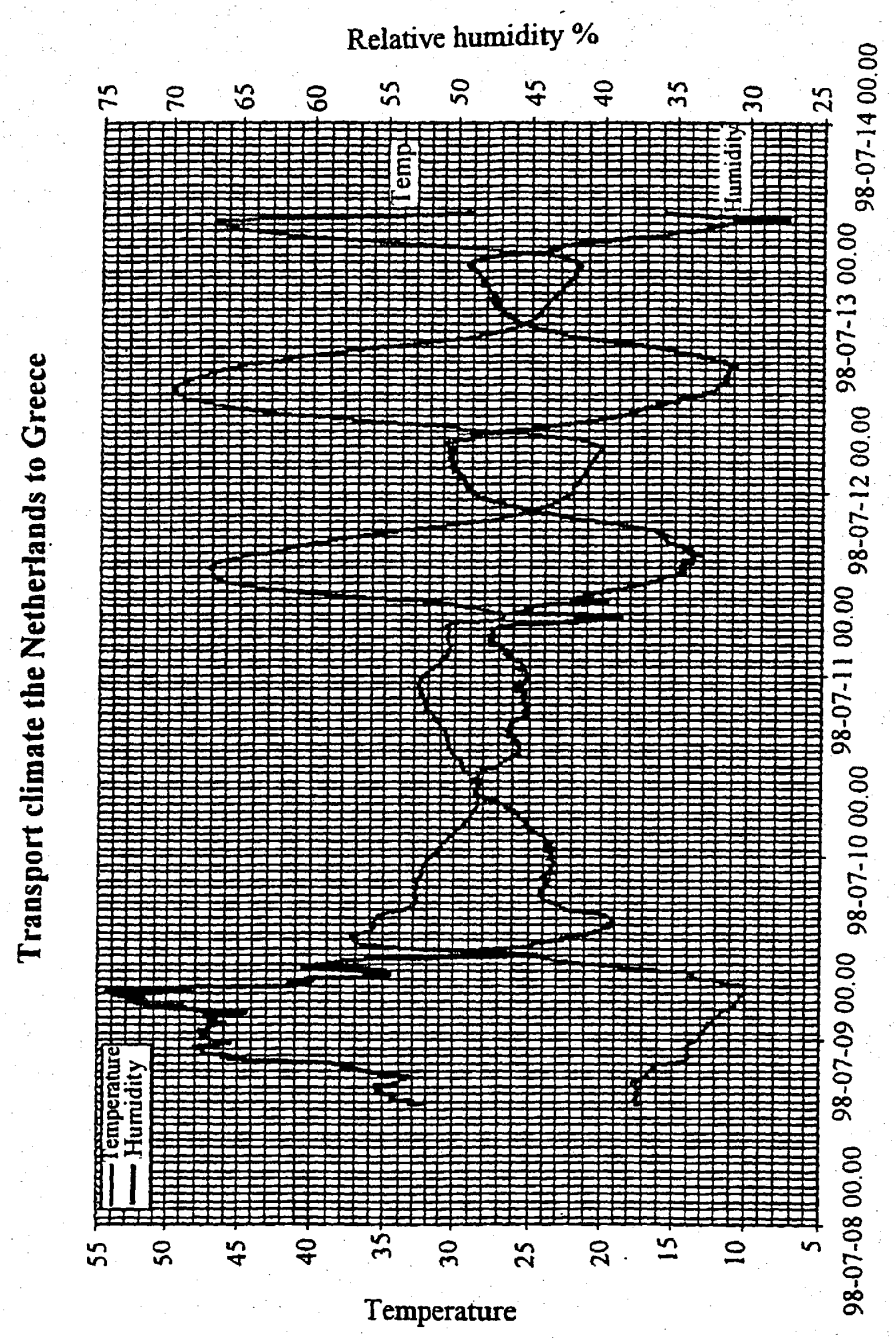
WO 00/76878 A1

(54) Title: THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES

(57) Abstract: Active additives in absorbent articles, such as sanitary napkins, panty liners, tampons, incontinence protectors and diapers have been found to lose their properties due to taking-up moisture during storage and transportation for instance, when conventional packaging materials are used. The invention relates to the use of a moisture impervious film material for packaging an absorbent article comprising one or more active moisture-sensitive additives. Packaging is effected in film material that has low vapour and gas permeability and in packaging units that have tight joins or seams.

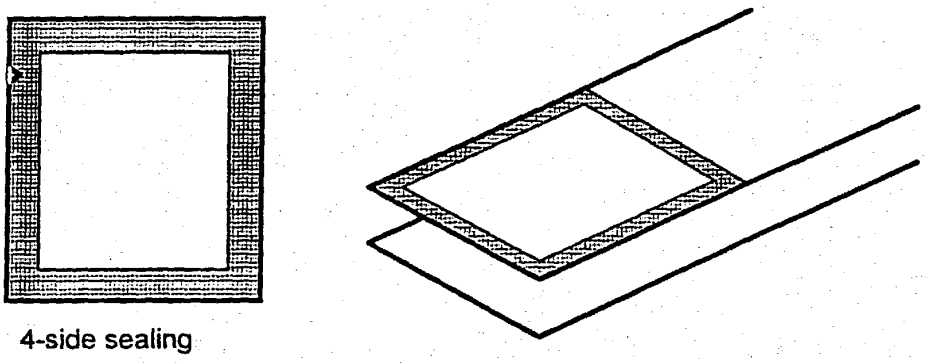
1/3

FIG. 1

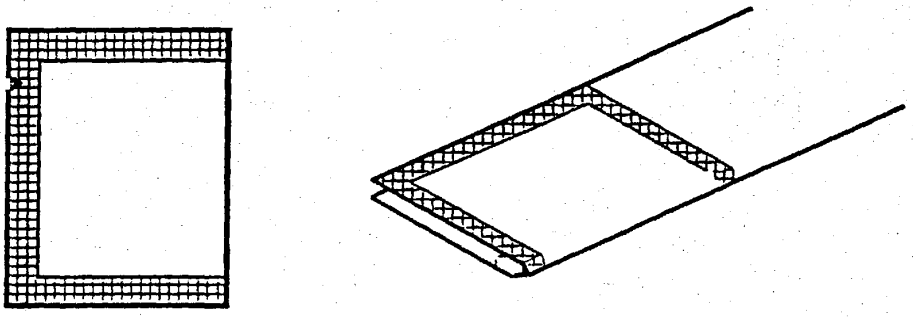

Relative humidity %
Transport climate the Netherlands to Greece
Temperature
Humidity
Temp
Humidity
Temperature

2/3

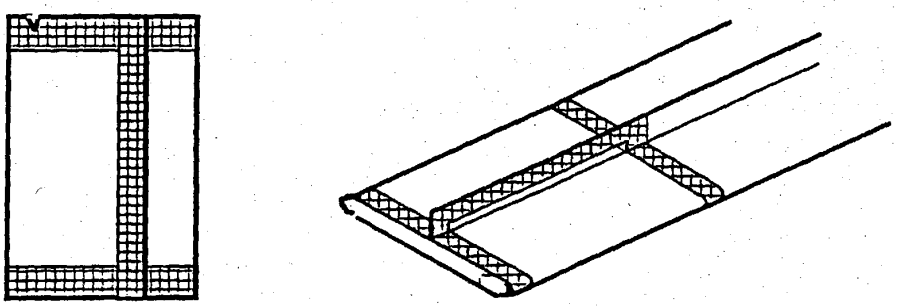
FIG 2



4-side sealing



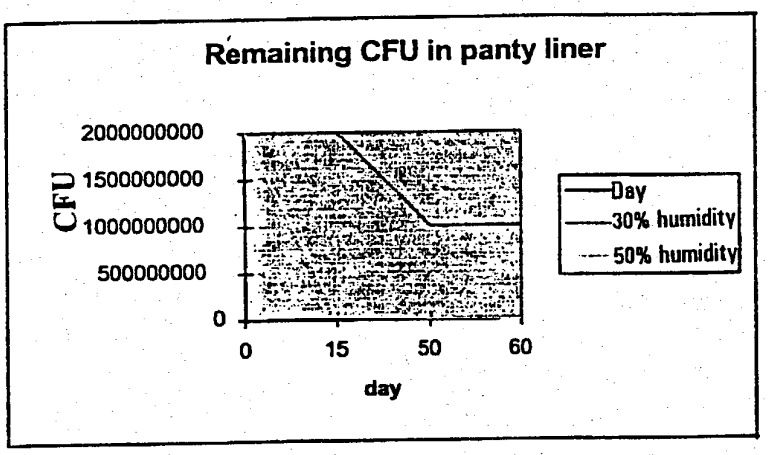
Folded film with 3-side sealing



Flow-packed with fin sealing

3/3

FIG. 3


Remaining CFU in panty liner
2000000000
1500000000
1000000000
500000000
0
CFU
0
15
50
60
day
Day
30% humidity
50% humidity

#7

000500-327
Attorney's Docket No.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application
Number _____ on _____
and was amended on _____ (if applicable).

☒ was filed as PCT international application
Number PCT/SE00/01207 on 09 June 2000
and was amended on 14 June 2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119(a)-(d):				
COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119	
			X Yes	No
			Yes	No
			Yes	No
			Yes	No
			Yes	No

Combined Declaration for Patent Application and Power of Attorney
(Includes Reference to PCT International Applications)
Attorney's Docket No. 00500-327

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

William L. Mathis	17,337	Eric H. Weisblatt	30,505	Bruce T. Wieder	33,815
Robert S. Swecker	19,885	James W. Peterson	26,057	Todd R. Walters	34,040
Platon N. Mandros	22,124	Teresa Stanek Rea	30,427	Ronni S. Jillions	31,979
Benton S. Duffett, Jr.	22,030	Robert E. Krebs	25,885	Harold R. Brown III	36,341
Norman H. Stepno	22,716	William C. Rowland	30,888	Allen R. Baum	36,086
Ronald L. Grudziecki	24,970	T. Gene Dillahunty	25,423	Brian P. O'Shaughnessy	32,747
Frederick G. Michaud, Jr.	26,003	Patrick C. Keane	32,858	Kenneth B. Leffler	36,075
Alan E. Kopecki	25,813	B. Jefferson Boggs, Jr.	32,344	Fred W. Hathaway	32,236
Regis E. Slutter	26,999	William H. Benz	25,952	Wendi L. Weinstein	34,456
Samuel C. Miller, III	27,360	Peter K. Skiff	31,917	Mary Ann Dillahunty	34,576
Robert G. Mukai	28,531	Richard J. McGrath	29,195		
George A. Hovanec, Jr.	28,223	Matthew L. Schneider	32,814		
James A. LaBarre	28,632	Michael G. Savage	32,596		
E. Joseph Gess	28,510	Gerald F. Swiss	30,113		
R. Danny Huntington	27,903	Charles F. Wieland III	33,096		

21839

and: _____

Address all correspondence to:

21839

Ronald L. Grudziecki
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404

Address all telephone calls to: William C. Rowland at (703) 836-6620.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

FULL NAME OF SOLE OR FIRST INVENTOR	Charlotte PERSSON
Signature	Charlotte Persson
Date	10 January 2002
Residence (City, State, Country)	Göteborg, Sweden SEX
Citizenship	Swedish
Mailing Address	Torild Wulffsgatan 47
City, State, ZIP, Country	SE-413 19 Göteborg, Sweden

2-00

FULL NAME SECOND INVENTOR, IF ANY	Håkan PERSSON
Signature	Håkan Persson
Date	10 January 2002
Residence (City, State, Country)	Göteborg, Sweden SEX
Citizenship	Swedish
Mailing Address	Sjömansgatan 7
City, State, ZIP, Country	SE-413 15 Göteborg, Sweden